

Price Determination for Corn and Wheat: The Role of Market Factors and Government Programs. By Paul C. Westcott and Linwood A. Hoffman, Market and Trade Economics Division, Economic Research Service, U.S. Department of Agriculture. Technical Bulletin No. 1878.

Abstract

Annual models for U.S. farm prices for corn and wheat are developed based on market factors as well as government agricultural commodity programs. The pricing relationships utilize a stocks-to-use modeling framework to capture the effects of market supply and demand factors on price determination. This formulation is augmented by factors that represent the changing role of agricultural policies, particularly government price support and stockholding programs. For wheat, international market effects as well as wheat feed use and related cross-commodity pricing considerations also are included. Model properties and model performance measures are presented. Additionally, recent price-forecasting applications of the models are discussed. The relatively simple structure of the estimated price models and their small data requirements lend themselves to use in price-forecasting applications in conjunction with market analysis of supply and demand conditions. In particular, the models have been implemented into USDA's short-term market analysis and long-term baseline projections. In these applications, the models provide an analytical framework to forecast prices and a vehicle for making consistency checks among the Department's supply, demand, and price forecasts.

Keywords: Corn, wheat, farm price, price determination, stocks-to-use ratio, price supports, commodity programs, forecasts.

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Summary

Corn and wheat crops have prominent roles in the U.S. agricultural sector as important sources of cash receipts and farm income to producers, in linkages within the agricultural sector among various crops and between crops and livestock, and as major crops in U.S. and global agricultural trade. Information affecting market conditions and prices for corn and wheat is particularly important as the sector has become more market oriented under agricultural policy changes of the last 10-15 years. Consequently, corn and wheat prices are carefully watched throughout much of the agricultural sector.

This technical bulletin examines some of the factors that affect U.S. farm-level prices for corn and wheat. Price determination models are developed for these crops using an annual framework. The models build on two types of factors that influence prices—market supply and demand conditions, and government policy variables.

A stocks-to-use ratio formulation is used to capture the effects of market supply and demand factors on price determination. This formulation is augmented by factors that represent the changing role of agricultural policies, particularly government price support and stockholding programs. The wheat price model also reflects the influence of international market conditions, represented by the stocks-to-use ratio for four major competitors. Additionally, the role of wheat feeding and competition with corn for feed use in the summer quarter affects the pricing of wheat.

Model properties are shown to indicate the relative sensitivity of prices to changes in the different independent variables. Additionally, model performance measures are presented and recent price-forecasting applications are discussed. Statistical evaluation measures indicate good performance for the price models. This is particularly the case given the large range of corn and wheat prices over the sample period used to estimate the model (1975-96) as well as the changing nature of the influence of government programs on price determination.

The relatively simple structure of the estimated price models and their small data requirements lend themselves to use in price-forecasting applications in conjunction with market analysis of supply and demand conditions. In particular, the models have been implemented into USDA's short-term market analysis and long-term baseline projections activities. In these applications, the models provide an analytical framework for forecasting prices and a vehicle for making consistency checks among the Department's supply, demand, and price forecasts.